

with the high water in the lake, flooded cellars, etc., causing considerable damage.

Tucson, Arizona: a freshet occurred at Pantano on the 9th. The railroad track was covered to a depth of several feet, and damaged.

Jackson, Hinds county, Mississippi: the rainfall of the 10th was remarkably heavy and caused considerable damage to the Yazoo railroad. Several bridges were washed away.

Galveston, Texas: the unprecedented rainfall at this place from the 15th to the 20th flooded a large part of the city. In many places the water covered the streets to a depth of more than one foot.

Vicksburg, Mississippi, 22d: the continuous rains in this section have caused great damage to the cotton crop. It is estimated that fully forty per cent. of the cotton in this section has been ruined.

Manatee, Manatee county, Florida: the very heavy rains on the 24th, 25th, and 26th washed away bridges and caused much damage to the roads in this part of the state.

Jacksonville, Florida: during the night of the 26-27th more than six inches of rain fell at this place. Dwellings and stores were flooded and railroads damaged.

Savannah, Georgia, 30th: no mails from Florida have been received during the last three days in consequence of washouts on the railroads. Reports from Brunswick, Georgia, state that twenty-five miles of the Brunswick and Western railroad, between Brunswick and Waynesville, have been washed away. From the 27th to 30th the rainfall at Savannah amounted to 5.50 inches. The damage to the rice crop in both Georgia and South Carolina has been very great. Many of the rice fields along the Savannah River have been covered with water.

#### STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for September, 1885, with the dates of occurrence, and the monthly ranges:

*Heights of rivers above low-water mark, September, 1885.*

[Expressed in feet and tenths.]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, Louisiana.....	29 9	11	4 2	4, 5	3 0	1 2
<i>Arkansas River:</i>						
Fort Smith, Arkansas.....	22 0	13	17 5	4, 28	4 0	13 5
Little Rock, Arkansas.....	23 0	15	17 1	7	4 8	12 3
<i>Missouri River:</i>						
Yankton, Dakota.....	24 0	2, 12, 13, 14	15 9	30	14 0	1 9
<i>Omaha, Nebraska.....</i>	18 0	3	8 4	30	6 6	1 8
<i>Leavenworth, Kansas.....</i>	20 0	1	10 2	30	7 3	3 0
<i>Mississippi River:</i>						
Saint Paul, Minnesota.....	14 5	6 to 19	3 9	6	2 9	1 0
La Crosse, Wisconsin.....	24 0	20, 21	6 2	7	4 0	2 2
Dubuque, Iowa.....	16 0	23, 24	6 7	7	4 5	2 2
Davenport, Iowa.....	15 0	15, 16, 17	5 9	7	3 9	2 0
Keokuk, Iowa.....	14 0	1	9 6	8	5 5	4 1
Saint Louis, Missouri.....	32 0	15	22 2	29, 30	13 0	9 2
Cairo, Illinois.....	40 0	17	21 4	30	13 8	7 6
Memphis, Tennessee.....	34 0	19, 20	15 0	1	9 2	5 8
Vicksburg, Mississippi.....	41 0	24, 25	21 9	4	12 0	5 9
New Orleans, Louisiana*.....	—3 0	26	—9 4	11	—12 3	2 9
<i>Ohio River:</i>						
Pittsburg, Pennsylvania.....	22 0	11	6 5	30	1 6	4 9
Cincinnati, Ohio.....	50 0	1	19 2	29, 30	5 3	13 9
Louisville, Kentucky.....	25 0	2	8 2	28, 29	3 6	4 0
<i>Cumberland River:</i>						
Nashville, Tennessee.....	40 0	30	1 4	13, 19	0 4	1 0
<i>Tennessee River:</i>						
Chattanooga, Tennessee.....	33 0	22, 23, 24	2 2	20	0 7	1 5
<i>Monongahela River:</i>						
Pittsburg, Pennsylvania.....	29 0	11	6 5	30	1 6	4 9
<i>Savannah River:</i>						
Augusta, Georgia.....	32 0	22	21 6	19	4 7	16 9
<i>Mobile River:</i>						
Mobile, Alabama.....	9	16	5	30	15 5	1 0
<i>Sacramento River:</i>						
Red Bluff, California.....	24	1	0	1 to 23	0 4	0 6
Sacramento, California.....	28	8	0	1 to 26	7 3	0 7
<i>Willamette River:</i>						
Portland, Oregon.....	10, 12, 13	4	4	19	2 4	2 0
<i>Colorado River:</i>						
Yuma, Arizona.....						

\* Below high-water mark of 1874 and 1883.

The observer at Chattanooga, Tennessee, reports that on the 13th the river reached a stage sufficient to permit the running of small boats, navigation having been suspended since August 25th. The lowest stage of the season occurred on the 20th.

#### HIGH TIDES.

Cedar Keys, Florida, 21st.

New River, Inlet, North Carolina, 10th, 11th, 27th, 28th.

Indianola, Texas, 18th.

#### LOW TIDE.

The following is an extract from the "New York Herald" of September 8, 1885:

QUEBEC, September 7, 1885.—The steamers Carmona, Brooklyn and Polyneesian, on their way down from Montreal, scraped ground several times, the two former vessels drawing twenty-five feet two inches, and the latter a few inches less.

The steamer Grecian, which grounded at Champlain, had to be lightened in order to get off. The Gulf lighthouse keepers report that the tides have of late run from four to five feet lower than has been known for the last fifty years.

#### VERIFICATIONS.

The percentages of verifications of special predictions for certain localities are, as follows:

Milwaukee, Wisconsin, 82.08; Auburn, Alabama, 79.17; Jacksonville, Florida (four days), 87.50; Omaha, Nebraska, 83.17; Arkansas, 84.62; Georgia, 87.50; Tennessee, 88.46; Dallas, Texas, 92.79 (as verified by observer, 92); Rochester and Oswego, New York, 80.00; Portland, Maine, 80.83; Chambersburg and York, Pennsylvania, 94.58; Richmond, Virginia, 89.17; Meadville, Pennsylvania, 85.00 (as verified by observer, 98); Oil City, Pennsylvania, 89.17 (as verified by observer, 100); Columbus, Ohio, 78.75; Bucyrus and northern Ohio, 80.00; Albany, New York, 91.25 (as verified by observer, 88); Cincinnati, Ohio, 76.67; Buffalo, New York, 75.83; Indianapolis, Indiana, 77.50; Chicago, Illinois, 78.33; Saint Louis, Missouri, 82.08; Cairo, Illinois, 83.75; Boston, Massachusetts, and New Haven, Connecticut, 90.00; (New Haven, Connecticut, as verified by observer, 88); Louisville, Kentucky, 75.83; Detroit, Michigan, 77.08; Kansas, Indian Territory, and western Missouri, 79.17; central Illinois and western Indiana, 83.75; northwestern Ohio and eastern Indiana, 82.50; Toledo, Ohio, 78.75; Memphis, Tennessee, 80.17; Shreveport, Louisiana, 81.03 (as verified by observer, 73); Cumberland, Maryland, 91.81; Hagerstown, Maryland, 90.09 (as verified by observer, 82); Lawrenceburg, Indiana, 83.19 (as verified by observer, for nineteen days, 91); Wheeling, West Virginia, 85.77 (as verified by observer, for twenty days, 87); Blanchester, Ohio, 82.33 (as verified by observer, 98); Portsmouth, Ohio, 81.90 (as verified by observer, 86); Parkersburg, West Virginia, 85.27 (as verified by observer, 83); Defiance, Ohio, 86.50 (as verified by observer, 94); District of Columbia and Baltimore, Maryland, 93.27; Cleveland, Ohio (twenty days), 79.38; Erie, Pennsylvania (twenty days), 84.38; Garrett, Indiana (nineteen days), 85.53 (as verified by observer, 100); Sandusky, Ohio (fifteen days), 83.33; Pittsburg, Pennsylvania (thirteen days), 88.46; Olney, Illinois (nine days), 95.53 (as verified by observer, 100); Mansfield, Ohio (nine days), 83.33; Connellsville, Pennsylvania (nine days), 93.06; Vincennes, Indiana (eight days), 96.88; Chillicothe, Ohio (seven days), 83.93; Somerset, Pennsylvania (three days), 75.00; Uniontown, Pennsylvania (one day), 75.00; Springfield, Missouri (one day), 100.00; New York City and Philadelphia, Pennsylvania, 93.75; (New York City, as verified by observer, for twenty-six days, 98); Colorado, 69.58; Eastman, Georgia (as verified by observer), 88; Bloomington, Illinois (as verified by observer), 89; Jessup, Georgia (as verified by observer), 100.

#### CAUTIONARY SIGNALS.

During September, 1885, one hundred and forty three cautionary signals were ordered. Of these, one hundred and six, or 74.13 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Thirty-four cautionary off-shore signals were ordered, of which

number, twenty-three, or 67.65 per cent., were fully justified both as to direction and velocity; twenty-six, or 76.47 per cent., were justified as to direction, and twenty-two, or 64.71 per cent., were justified as to velocity. One hundred and seventy-seven signals of all kinds were ordered. One hundred and twenty-nine, or 72.88 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, eighteen were changed from cautionary signals. Three signals were ordered late. In sixty-nine cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

#### RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for September, 1885, states:

The verification of predictions for the whole area was 80 per cent. for temperature and 86 per cent. for weather.

The following roads comprise this system: Western, of Alabama; South & North; Montgomery & Mobile; Mobile & Girard; Georgia Pacific; East Tennessee, Virginia & Georgia system in Alabama; Memphis & Charleston; Columbus Western; Atlanta and West Point, of Georgia; Northeastern, of Georgia; Atlanta & Charlotte Air Line; Western & Atlantic; Georgia; East Tennessee, Virginia & Georgia system in Georgia; and Savannah, Florida & Western.

#### ATMOSPHERIC ELECTRICITY.

##### AURORAS.

Fort Totten, Dakota, 1st: an aurora was observed from 9 p. m., continuing till 2.10 a. m. of the 2d.

Eastport, Maine, 2d: an auroral light of whitish color was observed from 8 until 11 p. m.

Fort Buford, Dakota, 3d: an auroral arch of whitish color, extending from northwest to northeast and to an altitude of 40°, was observed from 10.20 p. m. until about midnight. A dark segment extended to about 20° above the horizon, and from it streamers of straw color rose upward to, or a few degrees above, the arch.

Fort Totten, Dakota, 3d: an aurora was visible from 10.30 p. m. until daylight of the 4th.

Saint Vincent, Minnesota, 3d: a fine auroral display began at 10.15 p. m. and continued until early morning of the 4th. It consisted of two arches, the upper being but poorly defined. Bright waves of light flashed across the lower arch from east to west.

Alpena, Michigan, 3d: an aurora appeared at 10 p. m., consisting of a diffuse light in the northwestern sky.

Eastport, Maine, 3d: an auroral arch was observed from 7.15 p. m. until 1 a. m. of the 4th.

Manistiquet, Michigan, 3d: a diffuse auroral light, of moderate brilliancy, was observed from 9 p. m. until midnight; the light extended to an altitude of 40°.

Duluth, Minnesota, 4th: an aurora was visible from 7.30 to 11.30 p. m.

Cresco, Iowa, 4th: an aurora was observed from 8.30 to 10.15 p. m. in the northeastern sky; well-defined beams were observed from 8.45 to 9.

Marquette, Michigan, 4th: an aurora was observed at 10 p. m., consisting of an irregular arch covering 130° of the horizon and extending to an altitude of 40°. The display continued until after midnight.

Alpena, Michigan, 4th: an auroral light was observed at 9.40 p. m.; at 10.08 unusually brilliant streamers appeared in the west. The display was obscured by clouds at 11.45 p. m.

Grand Haven, Michigan, 4th: a faint aurora was observed through the broken clouds from 9.20 to 11.15 p. m.

Bismarck, Dakota, 4th: an aurora appeared at 9.50 and continued until 11.50 p. m. It was quite brilliant at the beginning of the display, when flashes of light were observed.

Saint Vincent, Minnesota, 4th: an aurora was observed at 9.20 p. m. When first noticed it consisted of pale, slender streamers, reaching an altitude of 30°. At 10.15 a well-defined arch appeared, from which streamers extended to the zenith. The aurora continued until 3 a. m. on the 5th, when it was obscured by clouds.

Moorhead, Minnesota, 4th: a faint aurora appeared at 9 p. m.; it assumed the form of an arch at 10.15, and several streamers appeared, extending upward 60°; the display ended at 11 p. m.

Fort Totten, Dakota, 4th: an auroral light was visible at dusk; three arches, 5°, 15°, and 40° altitude, respectively, with occasional shooting beams, were observed; the display ended at 8.40 p. m.

Fort Yates, Dakota, 4th: an aurora was visible from 10.15 to 10.20 p. m., covering 60° of the horizon and extending to an altitude of 10°.

Saint Paul, Minnesota, 4th: an auroral display was visible from 9.45 to 11.45 p. m., consisting at first of a deep yellowish glow, changing at 10 p. m. to a double arch, with broad streamers reaching from 20° to 40° above the horizon. At 11.45 all traces of the aurora had disappeared.

Fort Bennett, Dakota, 4th: at 12.15 a. m. an aurora, which was probably obscured during its greatest brilliancy, was observed in the form of a partial arch, covering 45° of the horizon and extending to an altitude of 20°; no streamers were seen.

Fort Sully, Dakota, 4th: a faint auroral arch was observed from 10.45 to 11.50 p. m.

Poplar River, Montana, 4th: an aurora, resembling morning dawn, appeared at 10.25 p. m. and remained visible until 4.30 a. m. of the 5th.

Fort Totten, Dakota, 14th: an auroral arch of 20° altitude was observed in the north from 9.30 p. m. until 3 a. m. of the 15th.

Alpena, Michigan, 14th: an aurora appeared at 10 p. m. and continued till 11.58.

Mount Washington, New Hampshire, 14th: a diffuse auroral light, having an altitude of 12° and extending over 80° of the horizon, was observed from 11.11 to 11.26 p. m.

Eastport, Maine, 14th: a faint auroral light was observed at 7 p. m. The display continued till 1 a. m. of the 15th.

Huron, Dakota, 15th: an aurora appeared in the northeast and north soon after midnight. At times bright beams rose almost to the zenith from an arch which extended along the horizon.

Valentine, Nebraska, 15th: an aurora was visible in the north-northeastern sky, with faint streamers extending upward 25°. The display was observed from 10.45 to 11.30 p. m.

Fort Benton, Montana, 15th: a brilliant aurora was observed through breaks in clouds during the evening.

Yankton, Dakota, 15th: very faint aurora, in the form of an arch with long streamers, was observed at 10.15 p. m.; at 11.10 streamers were shorter but more numerous.

La Crosse, Wisconsin, 15th: an aurora was observed from 9 p. m. until 2 a. m. of the 16th. At 9.50 a perfect arch was formed, with a few streamers reaching an altitude of 40°; at 10.30 a double arch extended along the horizon, the upper arch being indistinct; after midnight only a diffuse light remained.

Saint Paul, Minnesota, 15th: an auroral light was observed in the north at 9.35 p. m.; at 9.50 an arch formed; a few beams appeared between 10 and 10.15 p. m.; at 10.25 a band of light rose from the western horizon and extended across the sky, forming a complete arch which remained visible until 11.15 p. m. The aurora disappeared at 1.30 a. m. of the 16th. During the display telegraphic communication was interfered with to some extent.

Keokuk, Iowa, 15th: at 8.45 p. m. an auroral arch of pale yellow, covering 50° of the horizon, was observed; the display continued until 10.50 p. m.

Fort Yates, Dakota, 15th: a bright auroral display was observed from 9.30 to 11.55 p. m. A bright band of light, 1° in width, extended across the sky from east to west at 11.10.

Fort Buford, Dakota, 15th: a brilliant display of the aurora was observed from 9.54 to 11.30 p. m.; it was most brilliant from 10.38 to 10.40, when bright streamers extended to the zenith.

Fort Totten, Dakota, 15th: a brilliant auroral display was visible from 9.20 p. m. until 12.40 a. m. of the 16th.